of the Ægean above that of the Euxine; whilst, I argued, if the salt continually passing out of the Black Sea by the surface-current were not thus replaced, the continual excessive influx of River water would, in time, wash the whole of the salt out of its basin.

My position was assailed by Captain Spratt, who affirmed (1) that his own experiments in the Dardanelles had shown the existence of still water beneath twenty fathoms; and (2) that the return of salt to the Black Sea was effected by a *surface* in-current during the winter, when the rivers are low, and when the wind sets *from* the Ægean along the Dardanelles, the Sea of Marmora, and the Bosphorus.

On an examination of Captain Spratt's experiments, however, I came to the conclusion that, when rightly interpreted, their results bore out *my* view of the case; and, as I stated in my letters of Nov. 14, 1871, my interpretation of them had the sanction of three eminent Naval Surveyors. Captain Spratt maintained that because a surface-buoy from which a "current-drag" was suspended at a depth beneath twenty fathoms *remains stationary*, the waters in which the "drag" hangs must also be *motionless*. To me, on the other hand, it appeared indisputable that if the surface-buoy is floating in a *current* which puts a strong strain on the suspending line, that strain would draw the "current-drag" through *still* water; so that the stationary condition of its suspending buoy can only be accounted for on the supposition that the action of the surface-current on it is *neutralised by some pressure in the opposite direction*, which can be nothing else than that of an under-current *meeting* the "current-drag."

The question is discussed in an Appendix to the forthcoming Report of my last year's work in the *Shearwater*, of which the following (written on board of her a year ago) is an extract:—

"Now since, according to Captain Spratt, this stationary condition of the 'current-drag' was shown at all depths below forty fathoms in the Sea of Marmora (even down to 400 fathoms), and at all depths below twenty fathoms in the Dardanelles, it seems an irresistible conclusion that whilst there is a rapid superficial *out*-current, running in the Dardanelles at the rate of $2\frac{1}{4}$ miles per hour, there is a deeper *under*-current from twenty fathoms to the bottom, running more slowly *inwards* from the Ægean into the Sea of Marmora through the Dardanelles, and thence, it may be presumed, through the Bosphorus, into the Black Sea. And this conclusion finds complete confirmation in the results of a comparison between the respective Densities and rates of movement of the Dardanelles water at different depths, as observed by Captain Spratt himself. For whilst the progressive decrease in the movement of the 'current-buoy,' from $2\frac{1}{4}$ knots at the surface to almost nothing at twenty fathoms, indicates (as just now shown) first a cessation of all movement in the stratum in which the 'current-drag' hangs, and then a reversal in the direction of the current as the lower depth is approached,—the Density increased from 1,020 at the surface to 1,028 at twenty fathoms, and 1,029 at forty fathoms; the surface-water thus corresponding with that of the Sea of Marmora, whilst the water of the entire stratum from twenty fathoms to the bottom was equal in density to that of the Mediterranean. I hold, then, that the existence of an Under-current of dense Mediterranean water through the Dardanelles into the Sea of Marmora, is incontestably proved by the very experiments and observations which have been adduced by Captain Spratt as demonstrating the unsoundness of the Under-current doctrine."

Having understood that the *Shearwater*, on the completion of the Survey of the Gulf of Suez, would proceed to the Dardanelles, I requested the Hydrographer to direct that the question of the Under-current should be thoroughly examined; and he issued instructions accordingly.

I yesterday learned through the *Levant Herald*:—(1) that the existence of a strong Under-current has been placed beyond all question, a boat having been carried along by the "current-drag" suspended from it, *in opposition to the surface-current*: (2) that the rate of this Under-current is estimated as greater than the speed of the *Shearwater's* steam-launch; and (3) that it runs at a depth of twenty fathoms,—precisely that at which my interpretation of Captain Spratt's experiments has led me to predicate its existence.

I venture to think that this verification of my prediction will be regarded as a confirmation of the general Physical Theory of Under-currents on which it was based; and it is now for those who oppose that Theory to show by what other force than the difference in the *weight* of the Ægean and the Black Sea columns, consequent upon their great difference in Specific Gravity, the Dardanelles Under-current can be sustained.

WILLIAM B. CARPENTER

NOTES

MR. C. MELDRUM writes from Mauritius that he has been looking into the subject of the West Indian hurricanes, and he believes that they show a periodicity of frequency corresponding nearly with that of sun-spots. So far as he has yet examined the subject, the maximum of cyclone frequency is a year or two after that of sun-spots. It was so ten years ago, and is so again probably, the mean cyclone frequency occurring in 1862, and this year, 1872, being the most marked for hurricanes since. We greatly regret to hear that Mr. Meldrum is suffering severely from illness brought on by over-work. It will scarcely be credited that the only allowance made to him by the Government for an assistant is 50*l*. per annum!

WE learn from the *Gardener's Chronicle* that M. Milne-Edwards has undertaken a task for which all naturalists owe him thanks. The archives of the Museum of Natural History in the Jardin des Plantes contain a collection of 6,000 volumes and more than 1,500 manuscripts, which are almost entirely unknown to the scientific world; for nearly 60 years the dust that lay upon them has never been disturbed. In 1803 it was proposed to create a special department for these and other works and documents, but the idea was abandoned, and since that time the collection has remained huddled away in a corner, on account of space being wanting in the library of the museum. M. Milne Edwards has determined that such a state of things shall not be perpetuated, and has arranged that the collection shall be carefully examined, catalogued, and placed at the disposition of the scientific world. The manuscripts include a considerable number by Buffon, Cuvier, and Daubenton; there is a series of 24 pen-and-ink drawings by the last-named naturalist, representing the various types of Merino sheep, and exhibiting great artistic ability, and many albums filled with drawings of plants and flowers. It is proposed to add the books to the library of the museum, but there is so little space to be disposed of there, that it is expected the MSS. will be transferred to the great National Library, in the Rue Richelieu.

SIR DAVID BAXTER, who endowed in his life-time a Chair of Engineering at the University of Edinburgh, has by his will left the munificent gift of 40,000*l*. for the general purposes of the University.

THE death is announced, on the 16th inst. at Torquay, at the age of 75, of Lady Hooker, widow of Sir W. J. Hooker, K.H., formerly Director of the Royal Gardens, Kew.

MR. RAY LANKESTER, M.A., Fellow of Exeter College, Oxford, writes to correct the statement in our University Intelligence last week, that he has been appointed Deputy to the Linacre

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Professor of Anatomy and Physiology in that University. He is merely delivering a course of lectures at the request of the Linacre Professor, which the Professor has hitherto been in the habit of delivering himself.

By a majority of two to one the managers have decided to remit the question of the admission of lady medical students to the practice of the Edinburgh Royal Infirmary to a committee, to report "whether, and to what extent, it is practicable to give instruction to females within the wards of the Infirmary." The minority desired that arrangements should at once be made for the instruction of lady students. *Apropos* of this subject, a moiety of the 1,000*l.* recently promised by Mr. Walter Thomson to the funds of the Committee for securing a complete Medical Education of Women in Edinburgh has been forwarded to the Executive Committee; (1) in payment of expenses that have to be incurred in prosecuting the claim of women to the highest medical education obtainable in the University of Edinburgh and elsewhere; and (2) in assisting or encouraging lady students who have been subjected to extra charges by the obstacles interposed in Edinburgh.

A new University is to be opened on November 1, at Klausenburg, the capital of Transylvania.

Mr. Thomas Howard, of the King and Queen Iron Works, Rotherhithe, who was for 37 years an Associate of the Institute of Civil Engineers, has bequeathed to it the sum of 500*l.*, free of legacy duty, which sum he has, by will, directed "to be invested, and the interest thereof to be applied in such manner and under such conditions and instructions as the Council of the said Institution may think most expedient, for the purpose of presenting, periodically, a prize or medal to the author of a treatise on any of the uses or properties of iron, or to the inventor of some new and valuable process relating thereto, such author or inventor being a member, graduate, or associate of the said institution."

The following are among the publishers' announcements for the coming season:—By Mr. Murray:—The Expression of the Emotions in Man and Animals, by Charles Darwin, F.R.S. (with photographic and other illustrations); Records of the Rocks, a series of Notes on the Geology, Natural History, and Antiquities of North and South Wales, Siluria, Devon, and Cornwall, by the Rev. W. S. Symonds, F.G.S. (with illustrations); Travels in the Eastern Caucasus, on the Caspian and Black Seas, especially in Daghestan, by Lieut.-Gen. Sir Arthur Cunynghame, K.C.B. (with map and illustrations); The Geography of India, Ancient and Modern, an Elementary Manual for Students and General Readers, by Col. Yule, C.B. (with maps and woodcuts); The Longevity of Man, its Facts and its Fiction, including Observations on the more Remarkable Instances, and Hints for Testing Reputed Cases, by William J. Thoms, F.S.A.; Metallurgy of Gold, Silver, and Mercury, by John Percy, M.D., F.R.S., Lecturer on Metallurgy at the Royal School of Mines (with illustrations); The Geological Evidences of the Antiquity of Man, by Sir Charles Lyell, Bart., F.R.S., 4th edition revised; Metallurgy of Fuel, Wood, Coal, Copper, Zinc, &c.; also, Metallurgy of Iron and Steel, by John Percy, M.D., F.R.S., Lecturer on Metallurgy at the Government School of Mines (new and revised editions, with illustrations, 2 vols.); Siluria: a History of the Oldest Rocks in the British Isles and other Countries, by Sir R. I. Murchison, F.R.S. (5th and cheaper edition, with maps, plates, and woodcuts). By Messrs. Macmillan:—The Forces of Nature, a Popular Introduction to the Study of Physical Phenomena, by Amédée Guillemin, translated from the French by Mrs. Norman Lockyer, and edited, with Additions and Notes, by J. Norman Lockyer, F.R.S. (illustrated by 11 coloured plates, and 450 woodcuts); Papers on Electrostatics and Magnetism, by Prof. Sir W. Thomson, F.R.S.; The Depths of the Sea: An Account of Investigations conducted on board H.M.'s Ships *Lightning* and *Porcupine* in the Years 1868-9, under the Scientific Direction of W. B. Carpenter, M.D., F.R.S., J. Gwyn Jeffreys, F.R.S., and Wyville Thomson, LL.D., F.R.S., edited by Dr. Wyville Thomson (with illustrations). By Messrs. L. Reeve and Co.:—Lahore to Yarkand, Incidents and Natural History of the Expedition of 1870, by Dr. Henderson; On Harvesting Ants and Trap-door Spiders, by J. T. Moggridge, F.L.S.; Vol. 2 of the English Edition of Prof. Baillon's Natural History of Plants; and the Fifth Part of Hanley and Theobald's Conchologia Indica. By Messrs. Blackwood and Sons:—A Manual of Palæontology for the use of Students, by H. Alleyne Nicholson, M.D., D. Sc. Professor of Natural History and Botany, University College, Toronto (with 400 engravings); Advanced Text-Book of Botany for the Use of Students, by Robert Brown, M.A., Lecturer on Botany under the Science and Art Department of the Committee of the Privy Council on Education. By Messrs. A. and C. Black:—School Manual of Zoology, by Andrew Wilson (with illustrations; New Edition of Jukes' Scotch Manual of Geology, edited by Alfred J. Browne; New Edition of Elements of Mineralogy, by James Nicol, Professor of Natural History in the University of Aberdeen. By Messrs. H. S. King and Co.:—The Forms of Water in Rain and Rivers, Ice and Glaciers, by John Tyndall, LL.D., F.R.S. (with 32 illustrations); Physics and Politics, by Walter Bagehot, being vols. 1 and 2 of the International Scientific Series. By Messrs. Lockwood and Co.:—A rudimentary Treatise on Coal and Coal mining, by Warington W. Smyth, M.A.; Weale's Dictionary of Terms, new and enlarged edition, edited by Robert Hunt, F.G.S.; Waterworks for the Supply of Cities and Towns, with a description of the Principal Geological Formations of England as influencing Supplies of Water, by Samuel Hughes, new edit.; Projection, Orthographic, Topographic, and Perspective, giving the various Modes of Delineating Solid Forms by Constructions on a Single Plane Surface, by J. F. Heather, M.A.; A First Book of Mining and Quarrying, with the Sciences connected therewith, for use in Primary Schools and Self-Instruction, by J. H. Collins, F.G.S.; Places and Facts in Physical and Political Geography, for the use of Candidates in Public and Private Examinations, by the Rev. Edgar H. Rand; a Course of Analytical Chemistry, specially prepared for Universities and Science and Art Departments, Advanced and Honours Examinations, by W. W. Pink. By Messrs. S. Low, Son and Co.:—The Arctic Regions, illustrated with Photographs, taken on an Art Expedition to Greenland, by Wm. Bradford; with descriptive Narrative by the Artist; in 1 vol. royal broadside, 25 inches by 20 inches, bound in morocco; The Atmosphere, by Camille Flammarion, translated under the superintendence and revision of James Glaisher (with numerous woodcut illustrations and 10 beautiful chromo-lithographs). By Mr. Maclehose:—A Class-Book of Qualitative Chemical Analysis, by John Ferguson, M.A. By Trübner and Co.:—Mythical Zoology, or the Legends of Animals, by Angelo de Gubernatis, Professor of Sanskrit and Comparative Literature in the Instituto di Studii Superiori e di Perfezionamento, at Florence (2 vols.); A Practical Treatise on Pure Fertilisers, and the Chemical Conversion of Rock Guano, Marlstones, Coprolites, and the Crude Phosphates of Lime and Alumina generally, into various valuable Products, by Campbell Morfit, M.D., F.G.S. (with 28 Illustrative Plates or Construction Plans, drawn to Scale Measurements); Human Physiology, the Basis of Sanitary and Social Science, by T. L. Nichols, M.D. (with illustrations).

Prof. Galloway, of the Royal College of Science, Dublin, has two works nearly ready for the press:—"How the Natural Sciences are Taught, and how they ought to be Taught; with a Scheme for rendering more efficient the Government Science Schools;" and "A Manual of Applied Analysis."

THE first meeting for the season of the Victoria Institute took place on Friday last, when a number of new members were elected, the Society being stated to be greatly on the increase. The first paper to be read during the coming session will be by Mr. Charles Brooke, F.R.S., on Force and Energy.

THE Geologists' Association will hold its first meeting for the season on Friday evening, Nov. 1, when Dr. Hyde Clarke will read a paper on the Influence of Geological Reasoning on other Branches of Knowledge.

AMONG the courses of University Lectures and other means of scientific instruction announced to be given at Harvard University, Cambridge, U.S.A., during the present session, are the following:—On General Entomology, by Prof. Hagen—Mondays, Wednesdays, and Fridays, at the Museum of Zoology. Geological Excursions, by Prof. Shaler, on Saturdays—about eighteen during the year. On the Structure and Affinities of the Brachiopoda, by Prof. E. S. Morse—Mondays and Wednesdays, in Roylston Hall. On General Ornithology, by Mr. J. A. Allen—Wednesdays, at the Museum of Zoology.

THE following is the programme of papers to be read at the Winter Session, 1872-73, of the Glasgow Society of Field Naturalists:—On the present tendencies of Science, by J. Allan, Oct. 15.—On the Distribution of Plants, by D. Gregorson, Oct. 29.—A Life History of *Nematus saliceti*, together with some account of its Parasites, by P. Cameron, jun., Nov. 12.—On Spiders, by S. M'Donald, Nov. 26.—On Zoophytes, by W. D. Benson, Dec. 10.—On the Exotic Plants of Clydesdale, by R. M'Kay, Dec. 24.—On the Definition of Species, by Alex. Watt, Jan. 7, 1873.—Notes of Observations on Marine Zoology, by John Harvie, Jan. 21.—Notes of Observations with the Microscope, by G. Barlas, Feb. 4.—Botanical Gleanings from the Rubbish Heaps of the City, by G. Horne, Feb. 18.—On the Cynipidæ of the Glasgow District, by P. Cameron, jun., March 4.

A SERIES of short lectures is about to be delivered at the Ipswich Museum by the Curator, Mr. J. E. Taylor, and other gentlemen, illustrative of the objects in the museum. They will be held on Friday evenings throughout the winter, and admission will be free.

THE first of Abbé Moigno's long-contemplated *Salles du Progrès* was inaugurated on Tuesday evening, Oct. 15, at 30, Rue du Faubourg Saint Honoré, by a distinguished assembly, including M. Otto Struve, the Russian Astronomer. The praiseworthy object of the Abbé in establishing these assemblies is to popularise Science by means of lectures, exhibitions, conversaziones, &c., in which the instructive is combined with the entertaining. On Tuesday he detailed the programme which he intended carrying out at future meetings, and those present were entertained by the performance of some pieces of music. This last rather novel feature in scientific assemblies forms a regular part of the Abbé's programme. One or more pieces from the works of great masters of music will be performed at each meeting.

THE British Association Meeting at Brighton has already begun to bear fruit in that town. A desire has been aroused among several of the inhabitants to know more of Natural Science, and a course of science lectures in the Dome, chiefly to working men, has been projected. But the ladies have taken the initiative, and the germ of a Ladies' Educational Association has already been planted. Prof. W. F. Barrett has been invited to give the first course of lectures on Experimental Physics. The introductory lecture on the "Study of Natural Knowledge," was given last Friday afternoon, when, in spite of the wet, upwards of 50 ladies assembled. Miss Goulty, of 2, Sussex Square, Brighton, to whom it is right to add the effort is mainly due, has permitted the use of her spacious schoolrooms for these lectures. The second lecture on "Magnetism" will be given to-morrow (Friday) afternoon.

SIEBOLD'S NEW RESEARCHES IN PARTHENOGENESIS *

II.

SIEBOLD'S experiments extended over four years, and although some hundreds of nests were more or less observed, only thirty-seven—but these amply sufficient—gave the answer to his questions, passing successfully through all the stages above noted. Firstly, they furnished a virgin colony in a nest absolutely free from eggs and larvæ—except a few advanced larvæ purposely left in some nests and noted down—which colony laid eggs; secondly, these eggs produced without exception (some few eggs not developing) males.

The method of recording which was used must be mentioned to give a notion of the accuracy of the observations. A series of plans of each nest was kept, each cell being represented and its contents at different dates. Successive plans were used for recording the successive changes in the number of cells of the nest, and in their contents at different periods of the observations. Signs jotted down in the plan cells indicate such facts as these—*e.g.*, the cell contains a "parthenogenetic egg," or "a second parthenogenetic egg which was laid after a first one had disappeared," or "a larva sprung from the queen," or "a parthenogenetic male larva," &c., &c. A second record was kept, and is given for twenty-two cases, in which the following facts were noted:—Number of the nest, date it was made moveable, number of cells at that time, day of emergence of first worker-female, date of destruction of queen, eggs, and grubs, number of larvæ and pupæ left undestroyed at this date, date of first laying of parthenogenetic eggs, date of first emergence of parthenogenetic larvæ, date of first emergence of drones born from queens' eggs (these were null in most cases, and were always so late as not to affect the experiments by possibly impregnating the worker-female), number of the same, number of cells observed when the experimental conditions were established, date and duration of the experiment, maximum number of female workers employed in the affairs of the nest, number of larvæ, pupæ, and wasps of the parthenogenetic brood found at the conclusion of the experiment. After the account of the artificially obtained results, two cases are recorded in which Siebold found a parthenogenetic colony naturally established by the same accident which had destroyed their queen and comb.

Before concluding this chapter of his book, Siebold makes the very important observation that the facts observed in the parthenogenesis of Polistes are in opposition to the view maintained by Leydig, viz., that the sexual differentiation of the egg is independent of its fertilisation, and that the evolution of the male sex is due to diminution of nutrition and warmth. Bessels has already, in opposition to Landois, shown that this is not the case in the bee. If it were true for Polistes, the eggs laid in the early year, when it is cold, and when there is only the queen to attend to the larvæ, should produce drones. On the contrary, they produce females, and the drones appear precisely at the time when warmth and nourishment are most abundant.

Siebold concludes, therefore, that (1) the eggs bring with them from the ovary the capacity of differentiating themselves as males, and (2) of developing themselves, independently of male influence into male individuals; (3) but the same eggs can be changed in these properties by the influence of the male sperm elements, and proceed to develop as female individuals.

The second chapter, very short, is on Parthenogenesis in *Vespa holsatica*, which was inferred to occur from the observation of a naturally-produced queenless colony, the larvæ in the cells of which were all male.

The third chapter is on Parthenogenesis in *Nematus ventricosus*, the larva of which is known as the Gooseberry-caterpillar. Since three or more generations of these leaf-wasps occur in the season, they furnished abundant material, and the old supposition of parthenogenesis first put out as regards them by Robert Thorn, in the *Gardener's Magazine*, 1820, is shown by Siebold to be justified by carefully conditioned experiment. Some valuable observations on the anatomy of the generative organs, and on the curious increase in the size of the egg after it is laid, are given. The parthenogenetically produced progeny are in this case also male. The results of the *Nematus* experiments were not ready for publication until after the issue of the present work, and we

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* "Beiträge zur Parthenogenesis der Arthropoden." Von C. Th. E. von Siebold, Professor der Zoologie und Vergleichenden Anatomie in München. (Leipzig: Engelmann, 1871.)

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